Remote Ham Radio Station

How to do it?

by Alessandro Giusti IK5WJD

ikcsg@tin.it

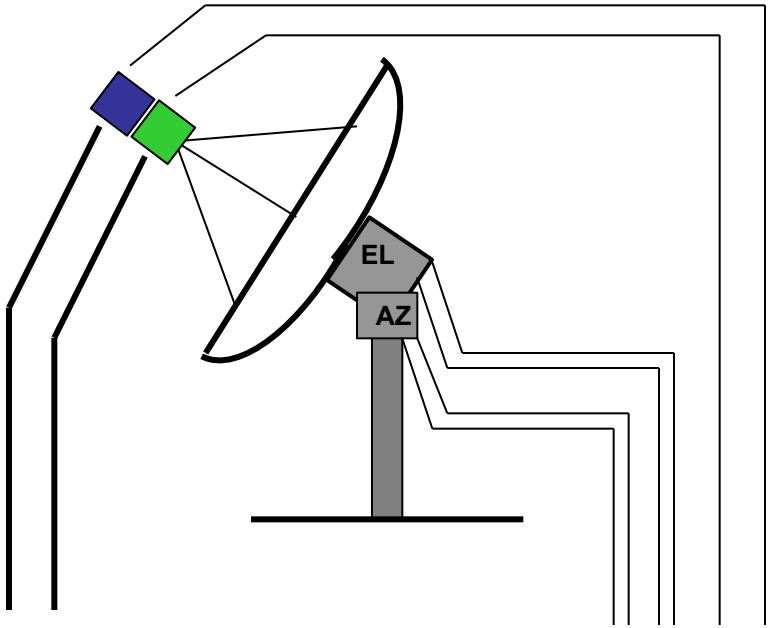
Automaz-Shack-IK5WJD-2.ppt

Intoduction

STATE OF ART

- How many cables you need to manage your antenna system ?
- How many remote equipments can I know the status, they will be working, not working or faulty ?
- If we want install some new remote devices, how many new cables would we hang out from shack to antenna ?

State of Art



Coaxial cable

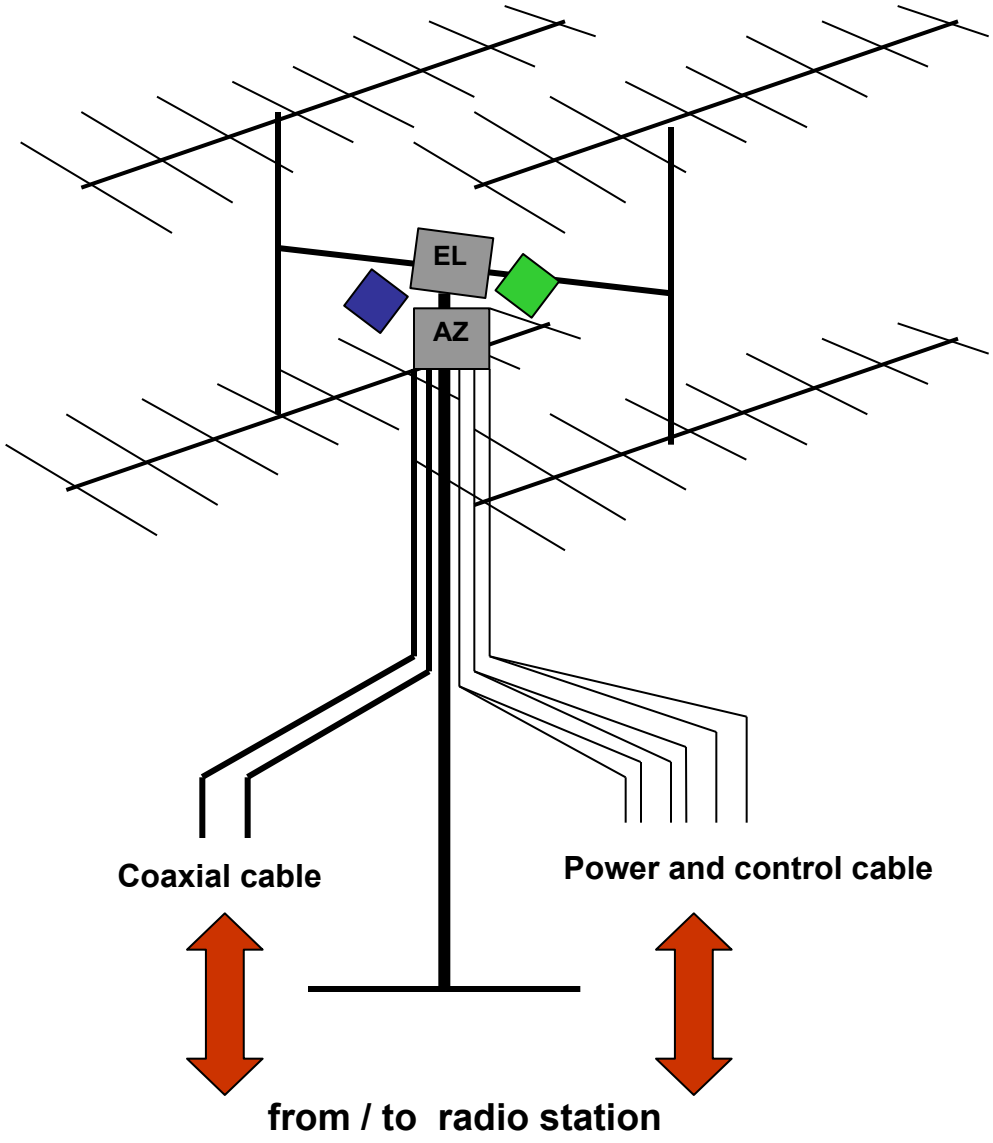
Power and control cable

remote antenna location

from / to radio station

Typical connection layout between radio station and remote antenna system

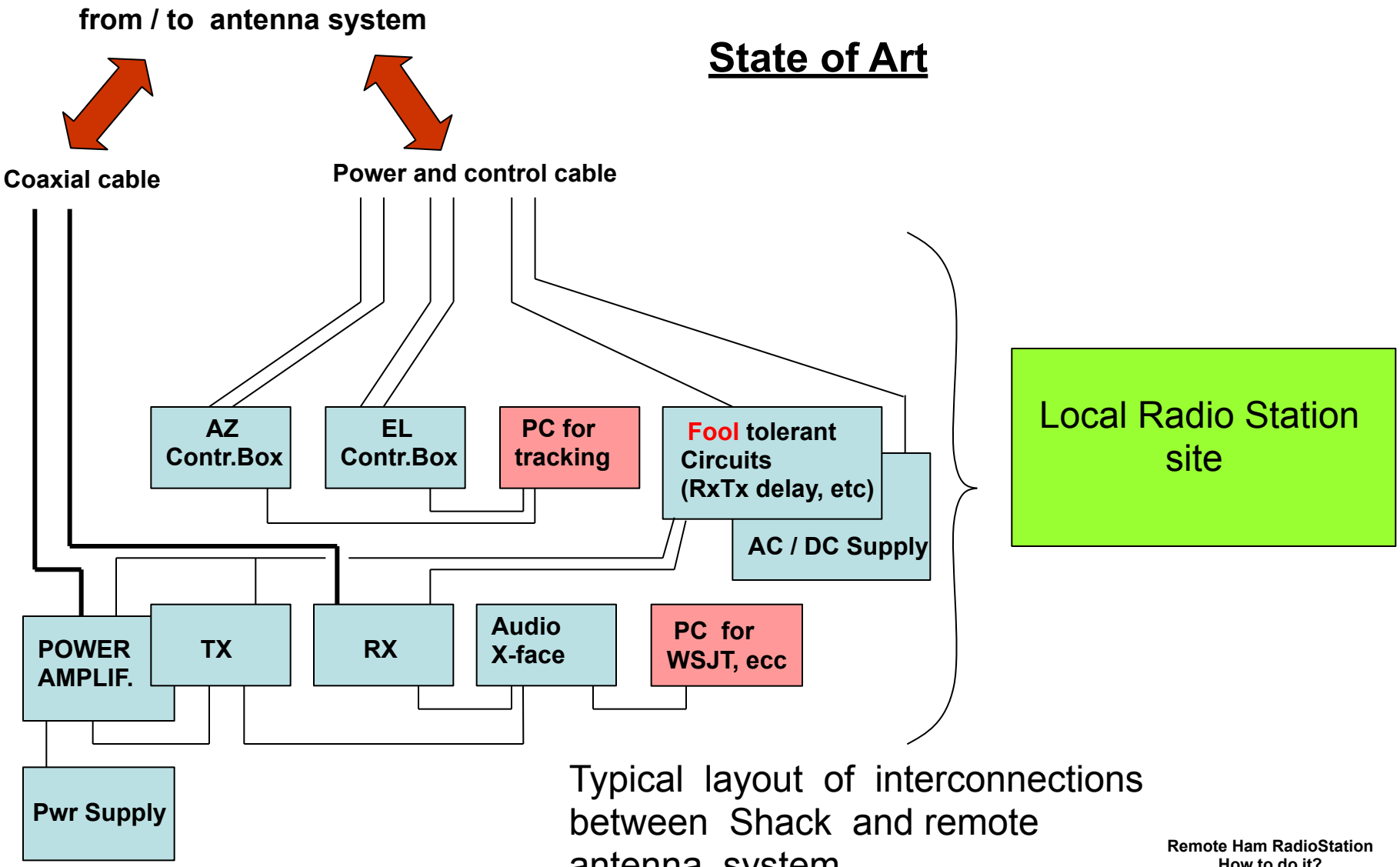
State of Art



remote antenna location

Another connection layout between radio station and remote antenna system

State of Art



Typical layout of interconnections between Shack and remote antenna system

A quick survey of problems due to various type of ELECTRICAL cables devoted either to carry some power supply or to manage different signals from Ham radio station to antenna .

- **Usually, in a " Ham typical system " the interconnctions between antenna and shack are maded with a discrete number to electrical cables with different wire thickness. We could find some cables for remotize AC equipment, with different working frequency and high currents, further DC voltages and digital pulses with low amplitude. This could produce many problems of mutual coupling between signals with different dinamic ranges.**

- **Whenever can be some encoders to detect the AZ + EL antenna position, the digital data could be send, from antenna to radio station, by means a couple of twisted pair shielded or not shielded.**
  If we utilize some PWM to manage the AZ+EL antenna rotators, in therms of frequency, torque and speed, there could be coupled very large spykes from the PWM on the encoder signals. It's necessary take proper cautions to avoid wrong data on the AZ+EL readout.

- **Recently some OM utilize a radio Link (on the 2,4 – 5,7 GHz bands) instead of cables, to manage remote transceivers and servo-relay, actuators and AZ+EL rotators.**

WORKING HYPOTESIS

- By taking a look around to detect the "State of Art" about the Remote Control Systems, the Ham Radio market offer some products, but no one in particular solve all our problems.
- Will be possible designe a new device (using the current offer of the market) which be able to manage our remote : antenna rotators, servo-relays, transceivers, etc… without cables in large quantities ?

State of Art

BIBLIOGRAPHY

RDP

http://support.microsoft.com/default.aspx?scid=kb;EN-US;q186607

Understanding the Remote Desktop Protocol (RDP)

Remote Desktop Protocol is based on, and is an extension of, the T-120 family of protocol standards. A multichannel capable protocol allows for separate virtual channels for carrying presentation data, serial device communication, licensing information, highly encrypted data (keyboard, mouse activity), and so on. As RDP is an extension of the core T.Share protocol, several other capabilities are retained as part of the RDP, such as the architectural features necessary to support multipoint (multiparty sessions). Multipoint data delivery allows data from an application to be delivered in "real-time" to multiple parties without having to send the same data to each session individually (for example, Virtual Whiteboards).

MIxW

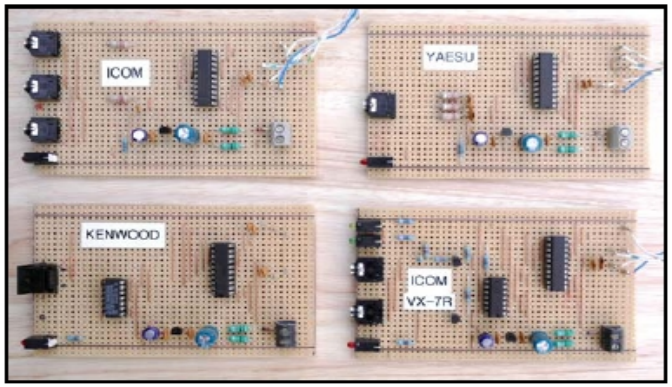
BIBLIOGRAPHY

State of Art

CATbox a Modular Computer Interface

by Bas Helman G4TIC

Introduction



CATbox is a modular computer aided transceiver (CAT) interface system comprising four stand-alone matrix board cards. One, or at most two, of these cards can be contained in a Hammond box – the CATbox. The cards are a slide-in fit to enable all the construction work to be completed outside of the box. A constructor can choose to build one to four boards depending on requirements. The Kenwood card is in prototype form and has not been fully tested. A box able to contain two cards was chosen to allow a pair of rigs to be controlled simultaneously. All the cards are powered from an external power supply of between 9 and 15V.

State of Art

BIBLIOGRAPHY BY GOOGLE

MixW - multimode software for radio amateurs- [Traduci questa pagina]
MixW is a multi mode multi functional software for every day logging and Contests. It has many useful features that make your QSO logging process almost a **...**
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Signals
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How to register

Ham Radio Deluxe: Home- [Traduci questa pagina]
Ham Radio Deluxe (HRD) is a suite of Windows programs providing CAT control for commonly used transceivers and receivers. HRD also includes mapping and **...**
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Info

State of Art

BIBLIOGRAPHY BY GOOGLE

Tibbo Technology - Serial Device Servers (serial-to-Ethernet ...

Tibbo's fixed-function serial device servers and Ethernet modules provide a fast and economical way to quickly network-enable any serial device.

www.**tibbo**.com/ - 23k - Cached - Similar pages

Downloads	EM1000
Products	Login help
EM202	Support
DS202	Order

More results from tibbo.com »

Linrad home page

Linrad is a computer program that can be run under Linux as well as under Microsoft Windows and Free BSD on a PC compatible computer. **Linrad** is available as ...

www.nitehawk.com/sm5bsz/linuxdsp/**linrad**.htm - 25k - Cached - Similar pages

OUR TARGET

We will attempt to made an "*AD HOC*" System Controller to solve several remote problem:

- Reduce the cables to the minimum.
- Make a sequence-controlled power-up/power-down.
- Make some different analogic measurements.
- Make some different digital measurements.
- Drive manually or automatically the AZ+EL rotators.
- Receive feedback from actuators/sensors.
- Management by private twisted pairs or by WAN.
- Using TCP-IP for manage and Internet Network.
- Management by Microwave Link.

CONNECTION by System Controller and twisted pair

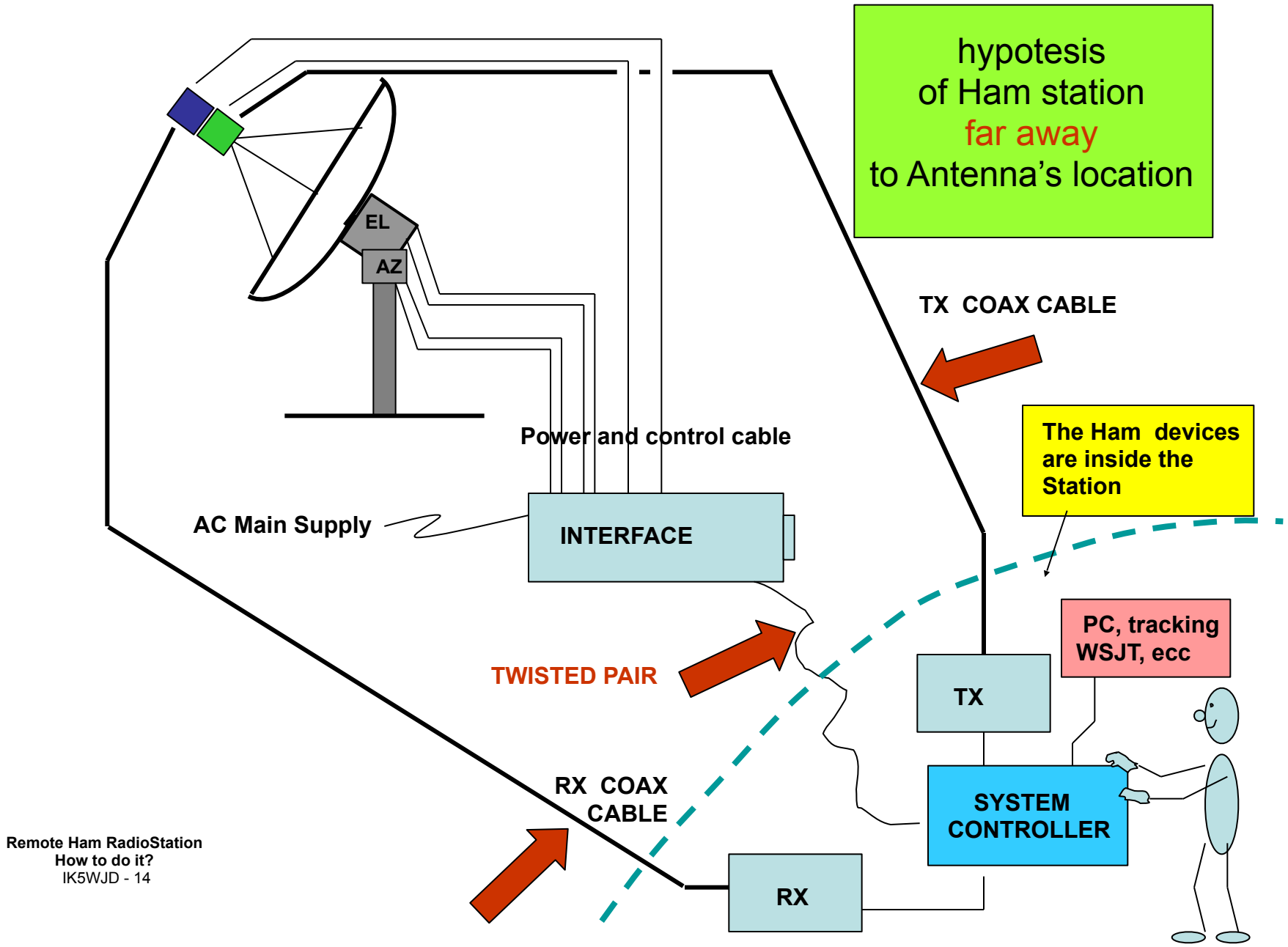
In the next drawings

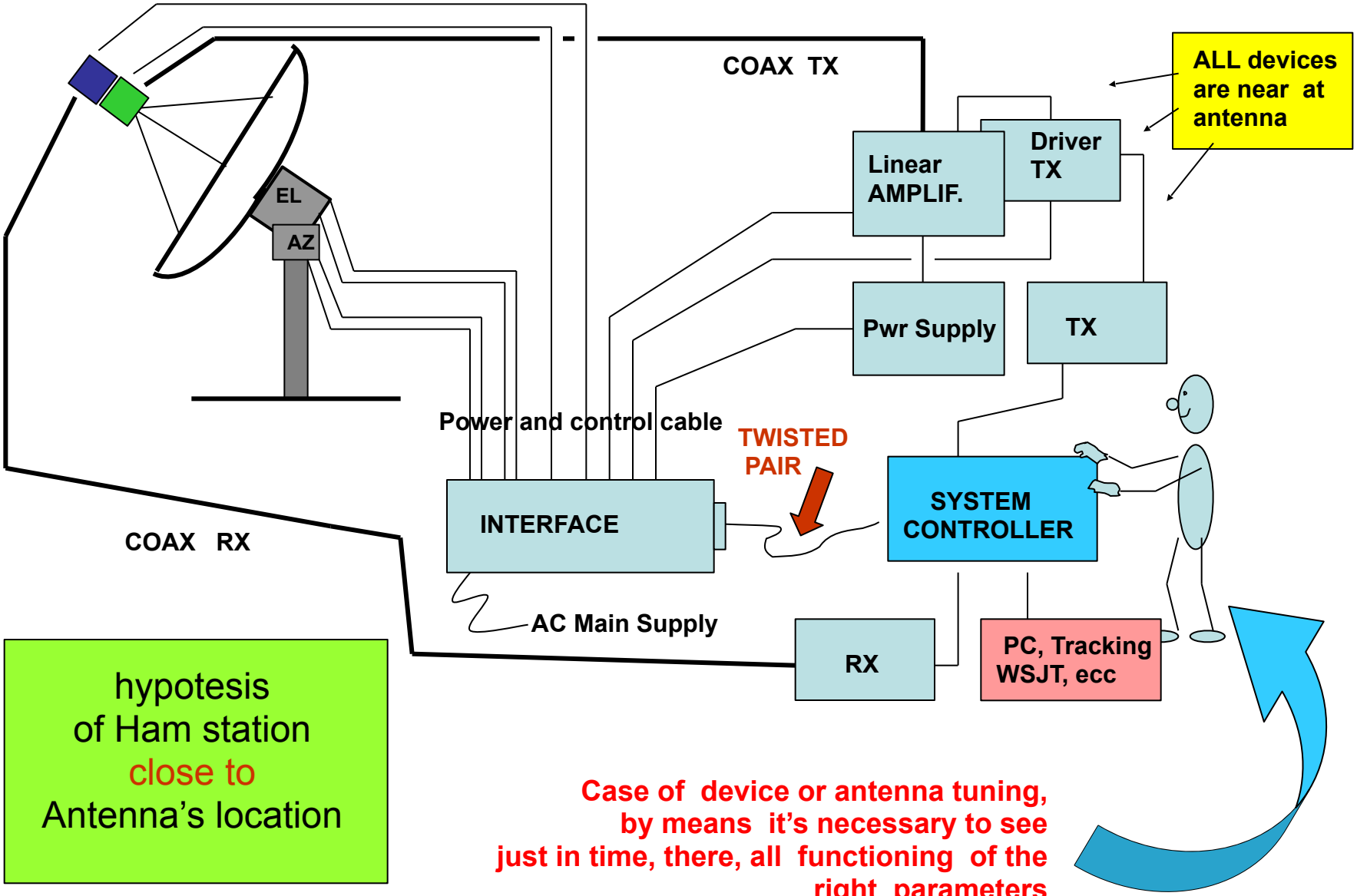
we suppose to REDUCE

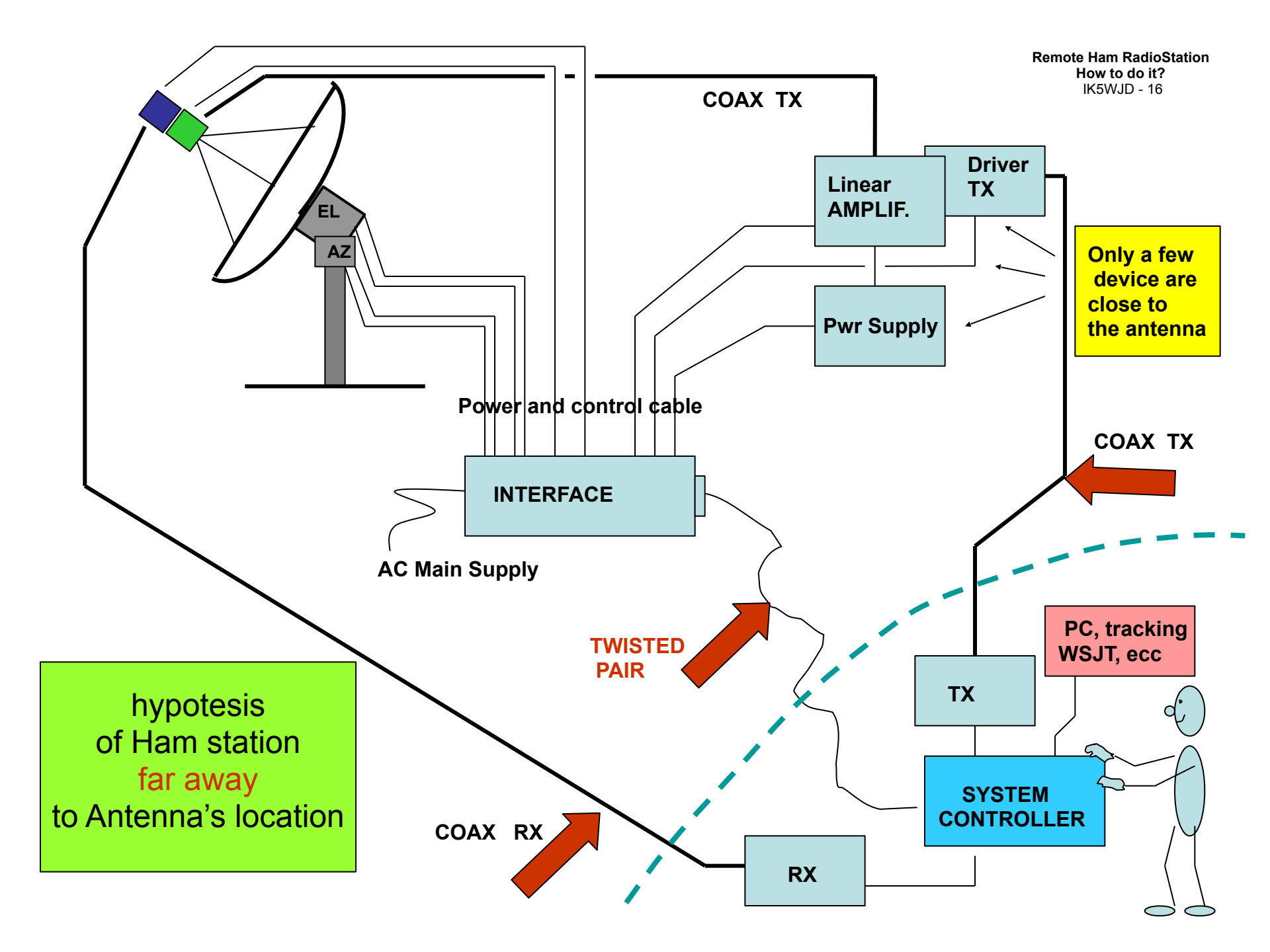
the QUANTITY of cables

necessary to interconnect

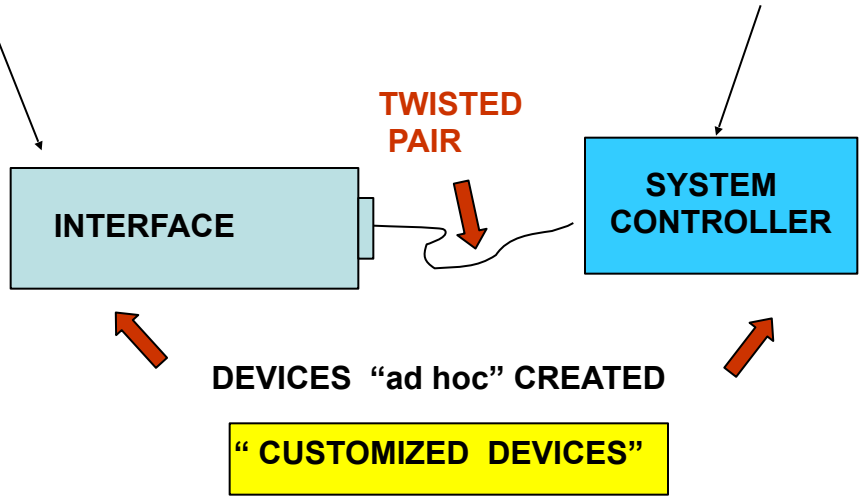
remote devices


hypotesis
of Ham station
far away
to Antenna's location
EL
AZ
TX COAX CABLE
Power and control cable
The Ham devices are inside the Station
AC Main Supply
INTERFACE
PC, tracking WSJT, ecc
TWISTED PAIR
TX
RX COAX CABLE
SYSTEM CONTROLLER
RX


COAX TX
ALL devices are near at antenna
EL
AZ
Linear AMPLIF.
Driver TX
Pwr Supply
TX
Power and control cable
TWISTED PAIR
INTERFACE
SYSTEM CONTROLLER
COAX RX
AC Main Supply
RX
PC, Tracking WSJT, ecc
hypotesis of Ham station close to Antenna's location
Case of device or antenna tuning, by means it's necessary to see just in time, there, all functioning of the right parameters


COAX TX
Linear AMPLIF.
Driver TX
EL
AZ
Only a few device are close to the antenna
Pwr Supply
Power and control cable
COAX TX
INTERFACE
AC Main Supply
TWISTED PAIR
PC, tracking WSJT, ecc
TX
SYSTEM CONTROLLER
COAX RX
RX
hypotesis of Ham station far away to Antenna's location

Reviewing all we have just discussed up to now, please note the remote control **system heart** mainly based on devices expressly drawed and created to carry out the wanted functions. This device are composed by two fundamental elements : the **INTERFACE** and the **SYSTEM CONTROLLER**

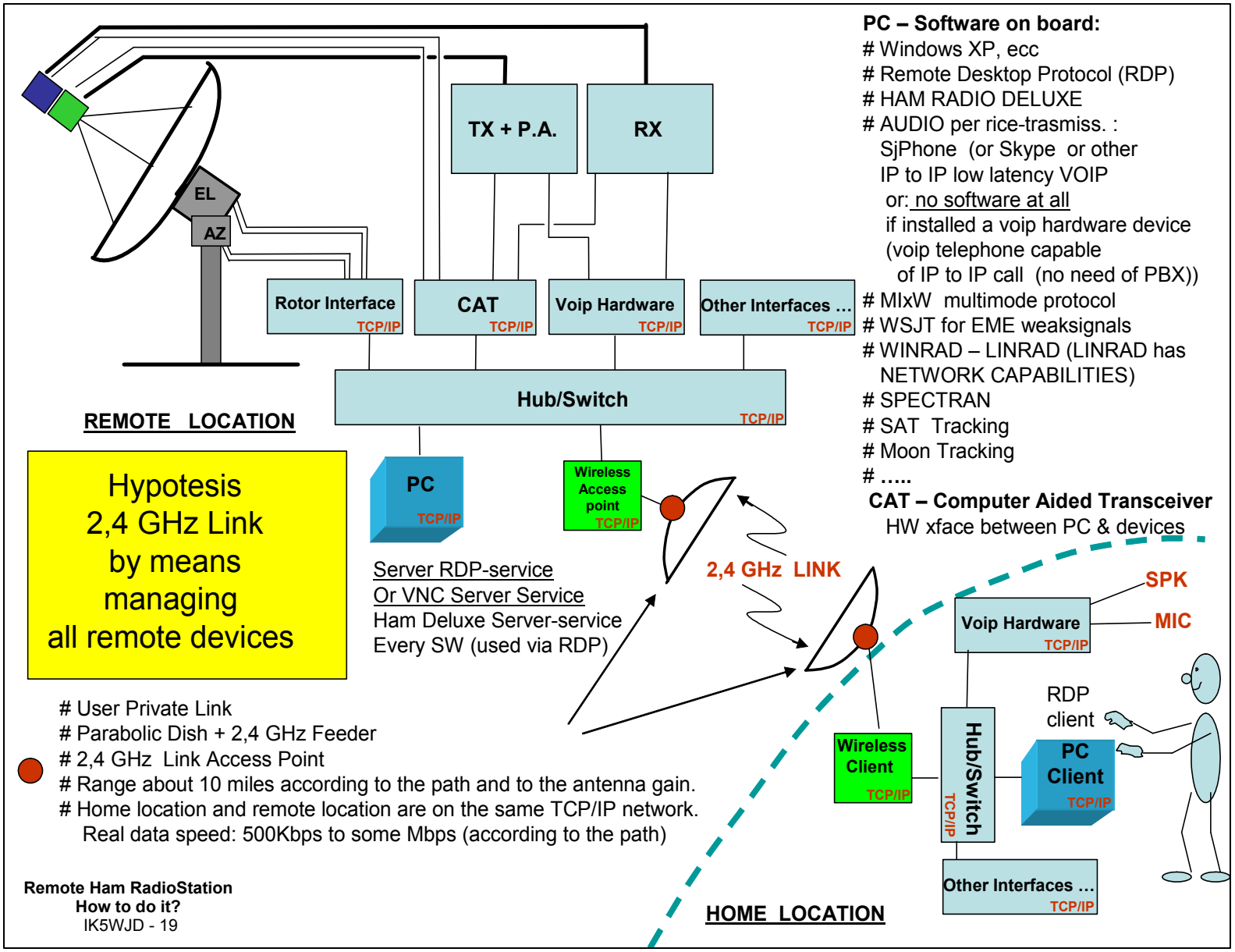


This customized device have to be designed by expert engineer, Ham oriented, which know the problematic nature that gravitate around to several equipment as : transceivers, power amplifiers, SAT or EME tracking systems, preamplifiers, Microwave Links, etc… . All togheter we define these things our **"desiderata"** which can work all togheter in perfect syncronization.

WIRELESS CONNECTION
without System Controller and twisted pair

In the next drawing
we suppose to utilize a Microwave Link
with parabolic dishes and proprietary Access Points
to interconnect two remote locations
by installing on PC board some softwares,
some Routers,
and relative software to manage :

Network protocols RDP and TCP-IP
HamRadio DeLuxe for Rx-Tx equipment,
Rotators and Power Amplifiers,
SjPhone or Skype for VOIP,
MIxW multimode protocol, PSK31, Hell, CW, etc…
WSJT for EME weak signals
VK3UM for EME Tracking


TX + P.A.
RX
EL
AZ
Rotor Interface
TCP/IP
CAT
TCP/IP
Voip Hardware
TCP/IP
Other Interfaces …
TCP/IP
Hub/Switch
TCP/IP
REMOTE LOCATION
Hypotesis
2,4 GHz Link
by means
managing
all remote devices
PC
TCP/IP
Wireless
Access
point
TCP/IP
Server RDP-service
Or VNC Server Service
Ham Deluxe Server-service
Every SW (used via RDP)
2,4 GHz LINK
PC – Software on board:
Windows XP, ecc
Remote Desktop Protocol (RDP)
HAM RADIO DELUXE
AUDIO per rice-trasmiss. :
SjPhone (or Skype or other
IP to IP low latency VOIP
or: no software at all
if installed a voip hardware device
(voip telephone capable
of IP to IP call (no need of PBX))
MIxW multimode protocol
WSJT for EME weaksignals
WINRAD – LINRAD (LINRAD has
NETWORK CAPABILITIES)
SPECTRAN
SAT Tracking
Moon Tracking
…..
CAT – Computer Aided Transceiver
HW xface between PC & devices
SPK
MIC
Voip Hardware
TCP/IP
RDP
client
Wireless
Client
TCP/IP
Hub/Switch
TCP/IP
PC
Client
TCP/IP
Other Interfaces …
TCP/IP
HOME LOCATION
User Private Link
Parabolic Dish + 2,4 GHz Feeder
2,4 GHz Link Access Point
Range about 10 miles according to the path and to the antenna gain.
Home location and remote location are on the same TCP/IP network.
Real data speed: 500Kbps to some Mbps (according to the path)

GATEWAY CONNECTION using ADSL line without a System Controller

In the next drawing
we suppose to use the
Public Network (WAN=Wide Area Network)
and some ADSL accesses
to interconnect two remote locations
by installing on PC board
some softwares to manage:

Network protocols RDP and TCP-IP
HamRadio DeLuxe for Rx-Tx equipments,
Rotators and Power Amplifiers,
SjPhone or Skype for VOIP,
MIxW multimode protocol, PSK31, Hell, CW, etc…
WSJT for EME weaksignals
VK3UM for EME Tracking

REMOTE LOCATION

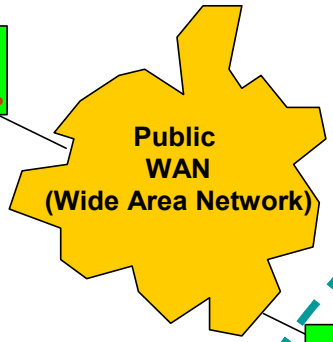
Remote LAN network

PC – Software on board:

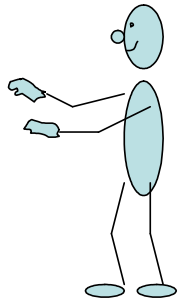
Same software used for LAN network.

Need to configure the gateway (firewall – NAT): the local TCP/IP port used by a program has to be reachable on the WAN and then re-transported to the remote LAN.

As the Internet operators do not guarantee a value for the latency, latency, and generically delay, could be a problem (according to what kind of remote operation are requested /installed and what kind of internet access someone have)



Hypotesis of public network using by the which managing all remote devices



Local LAN network,

HOME LOCATION

Rewieving that we seed in the next 4 slides, we can note that exist a difference between one project maded by the “CUSTOMIZED DEVICES” and other project maded with specific products which are normally on the market . The same concepts worth for some shareware source, created by a RadioHam exclusively for RadioHams.

Available Software by some RadioHams

PC – Software on board:
Windows XP, ecc
Remote Desktop Protocol (RDP)
HAM RADIO DELUXE
SjPhone (oppure Skype)
per rice-trasmiss. VOIP audio remoto
MIxW multimode protocol
WSJT per EME / weaksignals
WINRAD
SPECTRAN
SAT Tracking
Moon Tracking
.....

Available Hardware

CAT – Computer Aided Transceiver
interfaccia HW fra PC e apparati

CAT-Box

Available Hardware on the market